Trend Study 27-11-03

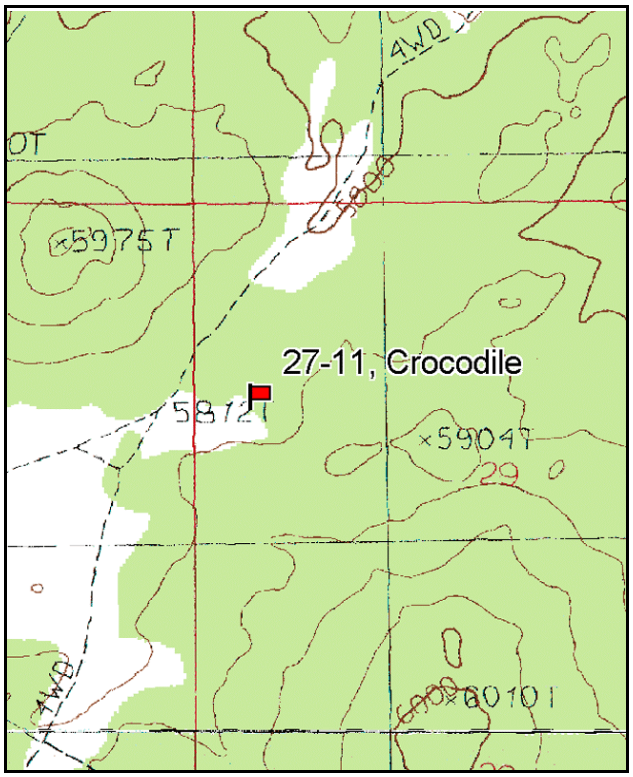
Study site name: Crocodile . Vegetation type: Basin Big Sagebrush.

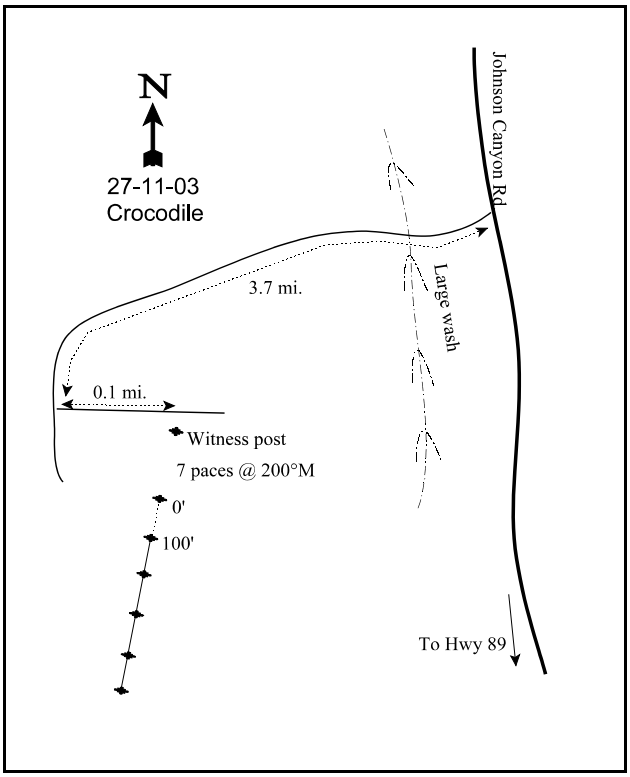
Compass bearing: frequency baseline 192 degrees magnetic.

Frequency belt placement: line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (95ft).

LOCATION DESCRIPTION

From the LDS church in Alton, travel south 10.8 miles. At this intersection turn left and head towards Kanab. Continue 6.8 miles to another intersection. Turn south on the pavement and go 9.8 miles to another intersection. Turn right (west) and go 0.1 miles to a left fork. Take this fork and go 3.7 miles across a large wash to a two track on the left. Go 0.1 miles to a witness post on the right (south) side of the road. From the witness post, walk 7 paces at 200 degrees magnetic to the 0-foot stake.





Map name: Cutler Point

Diagrammatic Sketch

Township 42S , Range 5W , Section 29

GPS: NAD 27, UTM 12S 4110325 N, 371620 E

DISCUSSION

Crocodile - Trend Study No. 27-11

This study was established in 1997 to sample critical winter range on the Paunsaugunt unit. It is located west of the Johnson Valley Road along the Wygaret Terrace about 1½ miles north of the head of Dairy Canyon. It samples a big sagebrush type with a scattered juniper overstory that was seeded with crested wheatgrass in the mid-1960's. Slope on the site varies from 3% to 10% with a slight north aspect. Elevation is approximately 5,800 feet. The vicinity is a concentration area for wintering deer. A pellet group transect read along the baseline estimated heavy deer use in 1997 and 2003 at 128 deer days use/acre (316 ddu/ha) and 88 deer days use/acre (218 ddu/ha) respectively. A few elk also utilize the area. Twenty-eight cow use days/acre (69 cdu/ha) were also estimated in 1997, declining to 12 days use/acre (30 cdu/ha) in 2003. Most of the herbaceous vegetation was heavily utilized at the time the transect was established on August 19, 1997, and a watering trough was found about 1/4 of a mile to the west of the study area.

Soils at the study site are very deep with an effective rooting depth estimated at nearly 35 inches. Soil texture is a fine sand, and pH is moderately acidic (5.8). Rock and pavement are rare on the surface or in the profile. Erosion in not a serious problem on the site due to the high infiltration capacity of the sandy soil combined with the gentle terrain. However, an erosion condition class assessment completed on site in 2003 rated soils to be slightly eroding due to high pedestalling and surface soil/litter movement. Soil temperature averaged 65°F and 71°F in 1997 and 2003 respectively at a depth of about 18 inches. This would suggest a dry soil profile. Herbaceous vegetation is limited, and bare ground is high at about 55% in both 1997 and 2003.

Basin big sagebrush and antelope bitterbrush represent the key browse on the site. Big sagebrush accounted for just over ½ of the total shrub cover in 1997 and 2003, while bitterbrush provided just under 40% of the browse cover in the same years. Basin big sagebrush had an estimated population density of 2,860 plants/acre in 1997 and 2,340 in 2003. Along with the slight decline in density, a major age class shift also occurred in the basin big sagebrush population in 2003. Young plants declined by more than half, and decadent plants increased from 12% to 57%. Nearly half (46%) of the decadent age class was classified as dying in 2003 which equates to ~620 plants/acre that could be lost from the population in the near future. Utilization has been mostly moderate, with poor vigor being found on 8% and 26% of the population in 1997 and 2003 respectively. Bitterbrush density was estimated at 900 plants/acre in 1997, increasing to 1,160 in 2003. This population consists of mostly heavily hedged, mature plants that have both upright and prostrate growth forms. Percent decadence was low in 1997 at 2%, increasing to 28% in 2003. Both basin big sagebrush and bitterbrush had good seed production in 2003, and annual leaders averaged 2.5 inches for sagebrush and 4.5 inches for bitterbrush. Other browse species that have been sampled on the site include broom snakeweed, rubber rabbitbrush, prickly phlox, sand sagebrush, and yucca.

The herbaceous understory is lacking. Grasses and forbs provide fair diversity but low production. Eight perennial grasses and 1 annual grass have been sampled on the site with needle-and-thread, sandhill muhly, Indian ricegrass, and blue grama being the most abundant. The area was seeded with crested wheatgrass in the 1960's, and this species was sampled in 20 quadrats in 1997. As with the Telegraph Flat study, crested wheatgrass was not sampled at all in 2003, and may have been “droughted out”. Most of the cool season grasses had been heavily utilized by livestock prior to sampling in 1997, but there was no noticeable use on grasses in 2003. Forbs are nearly nonexistent with 4 annual and 6 perennial species being sampled between both surveys. Forbs combined to produce about 1% average cover in 2003.

1997 APPARENT TREND ASSESSMENT

The soil on the site is extremely sandy and well drained. Over half (55%) of the ground surface is bare soil , and less than 20% of the ground surface is covered by vegetation. Litter cover is moderate at 34%. Seventy-

four percent of the vegetation cover comes from shrub crowns. However, due to the lack of significant slope and the high infiltration capacity of the sandy soil, erosion is not currently a problem on this site. Trends for the key browse species, basin big sagebrush appears slightly down and bitterbrush appears stable, but current use is extremely heavy. The herbaceous understory is very poor.

2003 TREND ASSESSMENT

Trend for soil is stable, but protective cover is poor. Bare ground remains high at over 55%. Signs of erosion were evident in 2003 including severe pedestalling around bunchgrasses and shrubs, and moderate soil/litter surface movement. Due to the high infiltration rate of this sandy soil, erosion is low except during high intensity summer thunderstorms. Trend for browse is down. The most abundant browse, basin big sagebrush, declined in density and reproduction, and showed increased decadence and poor vigor. Nearly half of the decadent age class was classified as dying which translates into ~620 plants/acre that could be lost from the population in the near future. Bitterbrush density slightly increased, but reproduction is poor. Decadence increased from 2% to 28%, and nearly the entire population of sampled plants displayed heavy use in 2003. Vigor remains mostly normal for bitterbrush. Trend for the herbaceous understory is down and in very poor condition. Perennial grasses significantly declined in sum of nested frequency. Crested wheatgrass was not sampled in 2003 and sandhill muhly, needle-and-thread, and sand dropseed all declined individually in nested frequency. Forbs are rare and provide little forage or diversity on this site.

TREND ASSESSMENT
soil - stable (3)
browse - down (1)
herbaceous understory - down (1)

HERBACEOUS TRENDS --
Management unit 27 , Study no: 11

Type	Species	Nested Frequency		Average Cover %	
		'97	'03	'97	'03
G	Agropyron cristatum	$_b$43	$_a$-	.30	-
G	Aristida purpurea	-	2	-	.03
G	Bouteloua gracilis	19	15	.11	.26
G	Muhlenbergia pungens	$_b$49	$_a$26	1.64	.43
G	Oryzopsis hymenoides	$_a$-	$_b$31	.00	.40
G	Sitanion hystrix	10	2	.12	.06
G	Sporobolus cryptandrus	$_b$60	$_a$8	.43	.01
G	Stipa comata	106	73	1.47	1.31
G	Vulpia octoflora (a)	$_b$54	$_a$-	.15	-
Total for Annual Grasses		54	0	0.15	0
Total for Perennial Grasses		287	157	4.10	2.51
Total for Grasses		341	157	4.25	2.51
F	Astragalus convallarius	-	3	-	.03
F	Astragalus spp.	$_b$14	$_a$-	.02	-
F	Comandra pallida	6	10	.06	.34

Type	Species	Nested Frequency '97	Nested Frequency '03	Average Cover % '97	Average Cover % '03
F	Eriogonum cernuum (a)	3	-	.00	-
F	Gilia spp. (a)	-	12	-	.09
F	Lappula occidentalis (a)	3	-	.01	-
F	Lotus utahensis	4	6	.01	.01
F	Oenothera pallida	$_{a}$-	$_{b}$10	-	.21
F	Plantago patagonica (a)	$_{a}$5	$_{b}$27	.01	.32
F	Sphaeralcea grossulariaefolia	$_{a}$3	$_{b}$19	.03	.10
Total for Annual Forbs		11	39	0.02	0.41
Total for Perennial Forbs		27	48	0.12	0.70
Total for Forbs		38	87	0.15	1.12

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --
Management unit 27 , Study no: 11

Type	Species	Strip Frequency '97	Strip Frequency '03	Average Cover % '97	Average Cover % '03
B	Artemisia filifolia	2	4	.15	.85
B	Artemisia tridentata tridentata	65	60	7.94	8.96
B	Chrysothamnus nauseosus hololeucus	15	10	.28	.15
B	Gutierrezia sarothrae	33	25	1.04	.11
B	Leptodactylon pungens	3	5	.04	.06
B	Opuntia spp.	3	0	.03	-
B	Purshia tridentata	28	33	6.02	5.97
B	Yucca spp.	1	1	.15	.15
Total for Browse		150	138	15.66	16.25

CANOPY COVER, LINE INTERCEPT --
Management unit 27 , Study no: 11

Species	Percent Cover '03
Artemisia filifolia	.56
Artemisia tridentata tridentata	11.61
Chrysothamnus nauseosus hololeucus	.71
Chrysothamnus viscidiflorus	.43
Leptodactylon pungens	.01
Purshia tridentata	10.00
Yucca spp.	.66

KEY BROWSE ANNUAL LEADER GROWTH --
Management unit 27 , Study no: 11

Species	Average leader growth (in) '03
Artemisia tridentata tridentata	2.5
Purshia tridentata	4.5

POINT-QUARTER TREE DATA --
Management unit 27 , Study no: 11

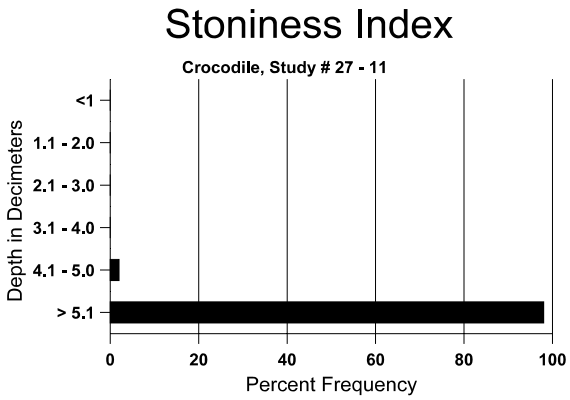
Species	Trees per Acre '97	Trees per Acre '03	Average diameter (in) '97	Average diameter (in) '03
Juniper osteosperma	10	N/A	13.4	N/A

BASIC COVER --
Management unit 27 , Study no: 11

Cover Type	Average Cover % '97	Average Cover % '03
Vegetation	18.82	20.57
Rock	.02	.06
Pavement	.08	.04
Litter	34.13	39.60
Cryptogams	.28	1.09
Bare Ground	54.99	55.61

SOIL ANALYSIS DATA --
Management unit 27, Study no: 11, Study Name: Crocodile

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
34.8	70.7 (18.1)	5.8	91.6	2.4	5.9	0.3	9.6	19.2	0.2



PELLET GROUP DATA --
Management unit 27 , Study no: 11

Type	Quadrat Frequency '97	Quadrat Frequency '03	Days use per acre (ha) '97	Days use per acre (ha) '03
Rabbit	29	16	-	-
Elk	8	-	1 (2)	-
Deer	44	37	86 (212)	88 (218)
Cattle	6	2	20 (49)	12 (30)

BROWSE CHARACTERISTICS --
Management unit 27 , Study no: 11

		Age class distribution (plants per acre)					Utilization				
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
Artemisia filifolia											
97	**60**	-	-	60	-	-	0	0	0	0	20/19
03	**120**	-	-	80	40	-	0	0	33	0	23/18
Artemisia tridentata tridentata											
97	**2860**	280	800	1720	340	420	32	7	12	8	46/49
03	**2340**	-	300	700	1340	680	53	.85	57	26	33/35

		Age class distribution (plants per acre)					Utilization				
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
Chrysothamnus nauseosus hololeucus											
97	**400**	-	60	280	60	40	0	0	15	5	23/27
03	**280**	-	-	160	120	-	0	0	43	7	28/31
Chrysothamnus viscidiflorus											
97	**0**	-	-	-	-	-	0	0	-	0	-/-
03	**0**	-	-	-	-	-	0	0	-	0	22/23
Ephedra viridis											
97	**0**	-	-	-	-	-	0	0	-	0	-/-
03	**0**	-	-	-	-	-	0	0	-	0	44/46
Gutierrezia sarothrae											
97	**1620**	-	140	1380	100	260	0	0	6	6	8/11
03	**1020**	-	740	240	40	-	0	0	4	0	9/10
Leptodactylon pungens											
97	**120**	-	-	120	-	-	0	0	-	0	6/3
03	**340**	-	-	340	-	-	0	0	-	0	5/6
Opuntia spp.											
97	**60**	-	-	60	-	-	0	0	-	0	3/6
03	**0**	-	-	-	-	-	0	0	-	0	-/-
Purshia tridentata											
97	**900**	-	80	800	20	20	36	56	2	2	71/81
03	**1160**	-	20	820	320	20	10	86	28	10	35/52
Yucca spp.											
97	**20**	-	-	20	-	-	0	0	-	0	20/37
03	**20**	-	-	20	-	-	0	0	-	0	39/57